

Remarks

Claims 1-18, 21-23, 59-78, 80-81 and 99 are pending in the application. Claims 19-20, 24-58, 79, and 82-98 have been canceled. Claims 1, 2, 10-11, 13-17, 22-23, 59, 68-74, and 80-81 have been amended. Claim 81 has been withdrawn as a result of an election of specie. New claim 99 has been added. No new matter has been added by virtue of this amendment. Reconsideration of the application as amended is requested.

Entry of the Present Amendment After Final

Amendments to limit 1 (a) clarify the wording. Amendments to 1 (d) change the order of recitation and provide the limits, previously recited only as structure limitations, as steps in a method that provide manipulation, as suggested by the Examiner. Similar amendments were made to claims 23 and 59. Minor amendments have been made to other claims. Dependent claim 2 has been broadened and new claim 99 includes the limit of original claim 2. Claims 82-98 have been canceled as a result of the restriction requirement. Applicant believes these amendments place the application in condition for allowance. Applicant respectfully requests entry of the present amendment and allowance of the application.

Election/restrictions

Claims 82-98 have been canceled.

Claim Rejections—35 U.S.C. § 102(b)

The Examiner rejects claims 1-4, 10, 12-17, 18, 22, 23, 59-62, 68, 70-78, and 80 under 35 U.S.C. § 102(b), as being anticipated by Ogata et al. The Examiner notes that "it has been held that to be entitled to weight in method claims, the recited structure limitations therein must affect the method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. . . In the instant case the recited structure limitation does not affect the method in a manipulative sense."

Applicant has amended independent claims 1, 23, and 59 to add the method in a manipulative sense. Thus, the limit should now be entitled to weight. For example, claim 1 has been amended as follows:

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1. A method for megasonic cleaning a substrate, comprising the steps of:
 - a) providing a container having sidewalls on all sides of said container, wherein at least two of said sidewalls have an overflow, said container having a container inlet for flowing fluid into said container, said inlet located below said overflows;
 - b) providing at least one from the group including a first megasonic transducer with a first active surface and a first array of megasonic transducers with a first array active surface for providing vibrational energy in said container;
 - c) disposing a substrate in said container within said sidewalls, below said overflow, and substantially parallel to and spaced a first spacing from at least one from the group including said first active surface and said first array active surface;
 - d) immersing the substrate in said fluid, **flowing said fluid upwardly in said container from said container inlet, through said first spacing, and over said overflows;** and
 - e) applying energy to at least one from the group including said first megasonic transducer and said first array of megasonic transducers to provide vibration in said fluid and to clean the substrate wherein substantially all vibration provided in said fluid is from at least one from the group including said first megasonic transducer, said first array of megasonic transducers, a transducer arranged parallel to said first active surface, and a transducer arranged parallel to said first array active surface.

Ogata does not teach or suggest the limits of element (d), "flowing said fluid upwardly in said container from said container inlet, through said first spacing, and over said overflows." Ogata provides inlets 8b to his container above outflows 6a, 6b from the container, thus providing a downward flow.

In response to the suggestion by the Examiner that inlets at the pump 10 of Ogata could be inlets below overflow 6, applicant would respectfully ask the Examiner to consider that claim 1 provides, "flowing said fluid upwardly in said container from said container inlet, through said first spacing, and over said overflows." The fluid is flowing upwardly in the container from the container inlet. The inlets at the pump 10 of Ogata are not provide fluid flowing upwardly in the container.

As to the response from the Examiner that the upper edge of the container of

Ogata could be the overflow, Applicant would respectfully ask the Examiner to consider that Ogata cannot allow fluid to flow over edges 7 of his tank 3 since the dirty water overflowing would strike cleaned substrate 2 as it emerges through opening 6b, defeating the cleaning process. In response to the suggestion by the Examiner that the shower provided by 12b takes similarly dirty cleaning fluid 5a from the top portion of the container, applicant would respectfully ask the Examiner to consider that, like shower 12a, shower 12b is shown with a cut off top half, indicating that the source for the fluid going to the shower is from a source above. Ogata expressly describes "fresh cleaning agent might be added by, for example, discharging a portion from the drain located on the bottom portion of the receiving/storage bath 9 and supplying a make-up portion by-pass from the fresh cleaning agent shower 12b, as shown in the figure (column 7, lines 6-10). Thus, the fresh cleaning agent is supplied both to the shower and to the top of the container. Thus, no dirty fluid from the top of the container is directed on the substrates at shower 12b. This is consistent with no dirty fluid 5a being permitted to spill over on the cleaned substrates. Furthermore, as shown in FIGS. 1 and 2, the top surface of cleaning fluid in the container, shown in dotted line, is sufficiently below the top level of the container to avoid spilling over the top edge.

Thus, the rejection of claims 1-4, 10, 12-17, 18, 22, 23, 59-62, 68, 70-78, and 80 under 35 U.S.C. § 102(b), as being anticipated by Ogata et al. have been traversed.

Claim Rejections--35 U.S.C. § 103(a)

The Examiner rejects claims 5, 11, 63, and 69 under 35 U.S.C. § 103(a), as being unpatentable over Ogata. The Examiner also rejects claims 1-5, 10, 11, 18, 21, 23, 59-63, 68, 69, 76-78, and 80 under 35 U.S.C. § 103(a), as being unpatentable over Akamuna et al. The Examiner also rejects claims 6-9 and 64-67 under 35 U.S.C. § 103(a), as being unpatentable over Akamuna in view of JP 5-13396 and also as being unpatentable over Ogata in view of JP 5-13396. The Examiner also rejects claims 12-17 and 70-75 under 35 U.S.C. § 103(a), as being unpatentable over WO 01/08200.

However, applicant would respectfully ask the examiner to consider that Akamuna, Ogata, JP 5-13396, and WO 01/08200 individually and in combination, do not teach or suggest "at least two sidewalls having an overflow" and "flowing said fluid upwardly in said container from said container inlet, through said first spacing, and over said overflows."

As indicated herein above, Ogata has a downward flow.

Akamuna teaches having an inflow on one side, an outflow on the opposite side, and two sides with sidewalls high enough to prevent outflow so that the flowing water reaches across the tank to the opposite side. Akamuna states,

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In operation, the work 6 to be washed is put on the roller conveyer 31 at the downstream end of the washing section 3 by a loading means, not shown, and transferred toward the upstream end in the counter-flow direction while undergoing washing actions by the wash liquid 5. The washed work is picked up out of the washing vessel 1 at the upstream end of the washing section by an unloading means which is also not shown. (column 7, lines 42-50).

Thus, it is critical in Akamuna that the fluid flow be continuous from one end to the other so that work 6 progressively gets washed by cleaner and cleaner fluid as it traverses washing section 3 toward the feed end of the washer fluid. If fluid flowed out over a sidewall along the way there would be that much less to clean entering work 6 as it enters and as it traverses, degrading cleaning. Thus, it would not be obvious to provide for overflow at two or more sidewalls. Akumuna must have fluid enter at one end and travel all the way across to the other without losing fluid along the way. Akumuna can have overflow on one and only one side of his container, at the very end of the cleaning section. Otherwise Akamuna's purpose of providing fluid flow across the tank would be defeated by providing an overflow on more than one side.

Furthermore, the inlet of Akamuna at the lower end of conduit 25 is located higher than the overflow. Thus, Akamuna does not teach or suggest an upward flow from inlet to overflow.

JP 5-13396 does not teach or suggest flow at all. There is no mention of overflow.

The WO 01/08200 patent has overflow exclusively on one side, as shown in FIG. 1 by numerals 44, 45 and as acknowledged by the Examiner. The overflow appears to be controlled by adjustable edge 44. Even if the idea of flowing fluid over overflows on more than one side were considered, further invention would be required to coordinate providing multiple adjustable edges on multiple sides and for providing common adjustment to those multiple adjustable edges so that fluid would indeed flow over both.

The Examiner states that it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. However, applicant would respectfully ask the Examiner to consider that in this case more than mere duplication is required since coordination among them is needed to provide the same adjustable height for each so both actually provide flow over the overflow. None of the references teach or suggest any reason to go to this trouble or expense. While, as the Examiner points out, the claims do not exclude such adjustment so as to provide coordinated adjustment of overflows on sidewalls, none of the references provide any reason or motivation for providing multiple overflows, and none provide teaching or suggestion to use multiple overflows.

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It was applicant who recognized that providing an overflow on at least two sides significantly improves cleaning. Applicant recognized that with flow directed exclusively to the left side, as in the WO 01/08200 patent, flow must extend across wafer 3 from right to left, and there is more likelihood that particles removed from the wafer will drop back on the wafer as compared with a design having an overflow on at least two sides and fluid flow upwardly to both overflows on both sidewalls. Applicant also recognized that flow would not be exclusively up and to the left to the single overflow. Instead there would be a greater chance of turbulence directing flow back down as the fluid crossed over the wafer. The absence of multiple overflows in the four references cited by the Examiner demonstrates that this improvement was not contemplated or obvious at the time the present application was filed.

Therefore the rejections under 35 U.S.C. § 103(a), as being unpatentable over any combination of Akamuna, Ogata, JP 5-13396 and WO 01/08200 have been traversed.

It is believed that the claims are in condition for allowance. Therefore, applicant respectfully requests favorable reconsideration. If there are any questions please call applicant's agent at 802 864-1575.

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